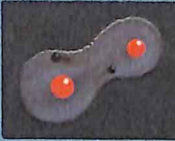
# READ ABOUT SCIENCE 7

# SOUND



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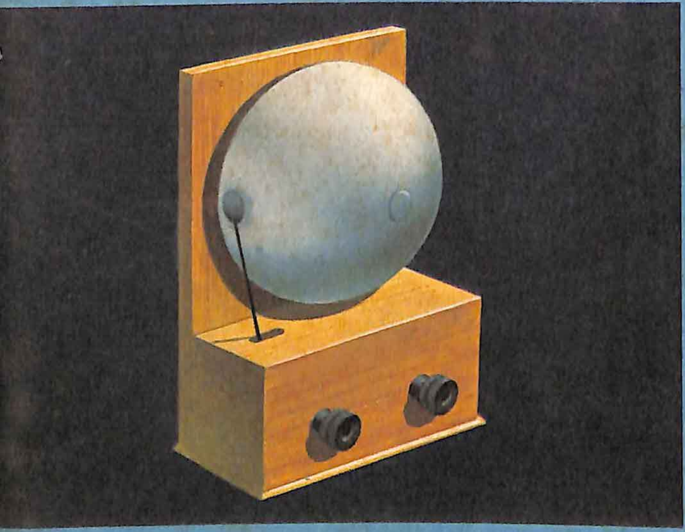

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We hear many, many sounds every day of our lives. Some sounds are pleasant and others annoy us.

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Sound is produced when something vibrates. When you speak, the vocal cords in your throat vibrate. The buzz of a mosquito is made by the vibration of its wings.

We use the word *pitch* to describe a sound. The sound of a whistle is high-pitched; the sound of thunder is low-pitched.

On the next page is a picture of a violinist. He draws his bow across the violin strings to make them vibrate. By moving his fingers up and down he can make different lengths of string vibrate.

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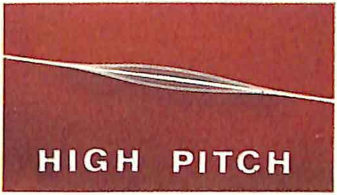
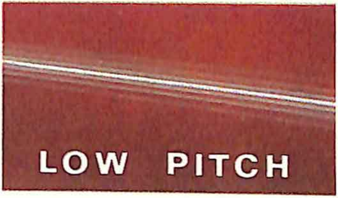


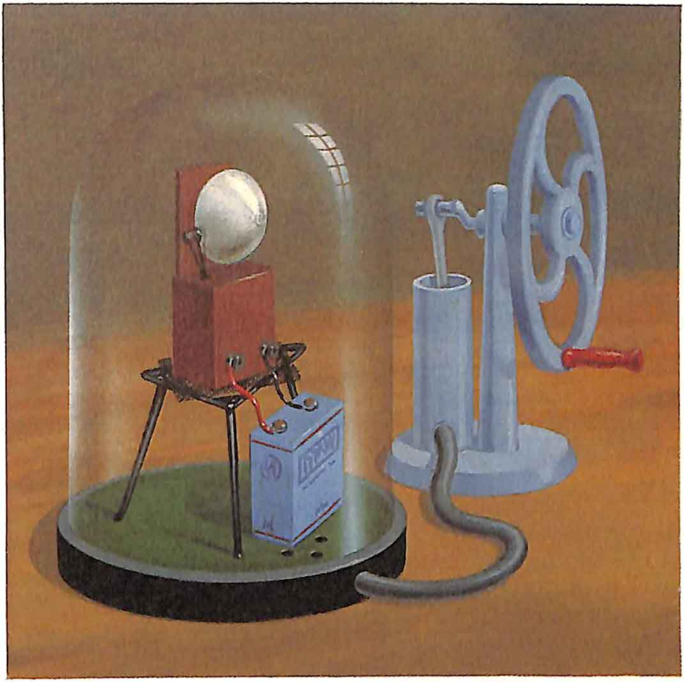


This produces notes of different pitch.

When a sound is made, the vibrations cause the air to move very slightly backwards and forwards. This movement is called a sound wave.

We hear a sound only when a sound wave reaches our ears.

Sound waves need something to travel in, but light waves can pass through a vacuum. The picture opposite shows an electric bell ringing inside a glass jar. As the air is sucked out by a pump, the ringing grows fainter. When most of the air has been pumped out, the bell cannot be heard.

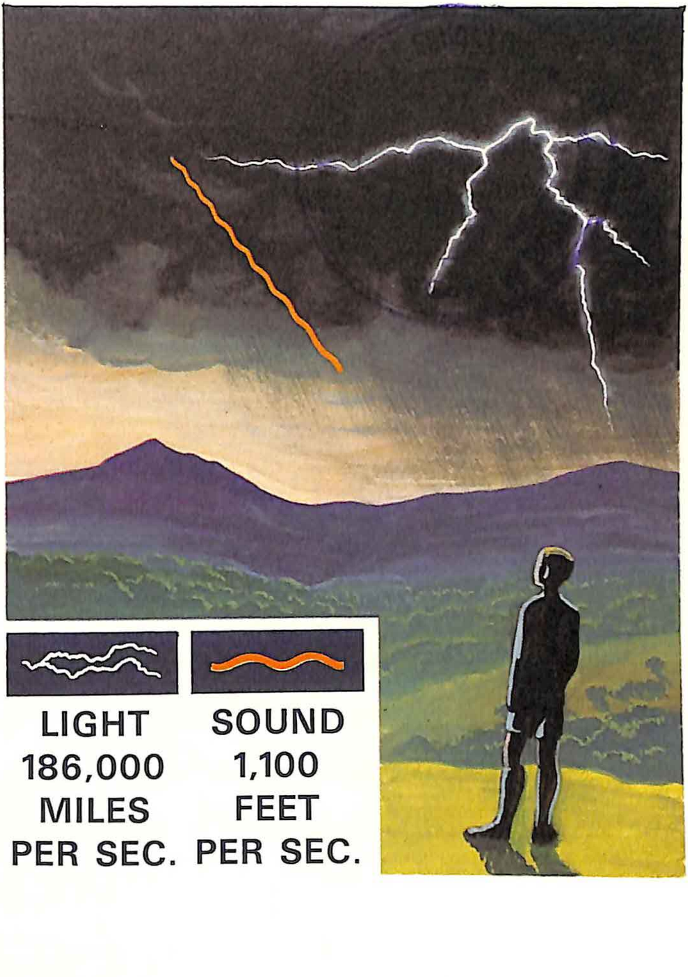


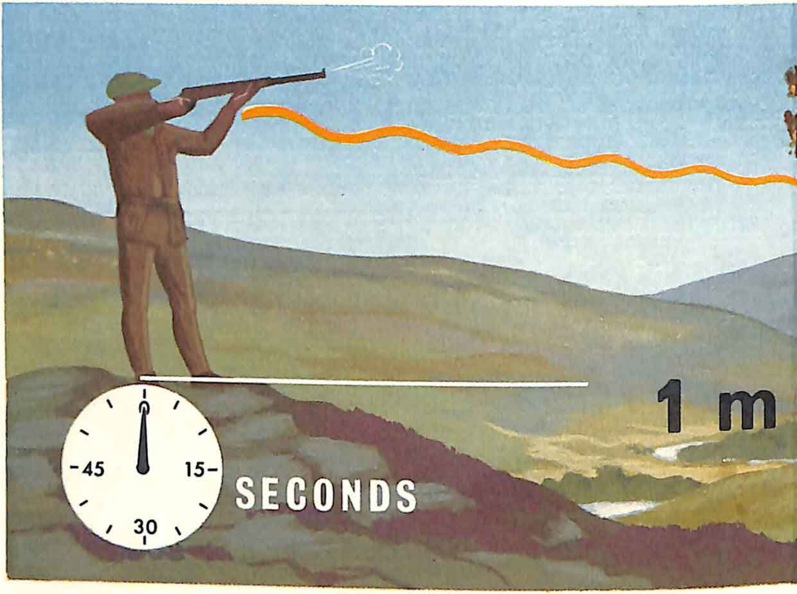
Sound waves cannot travel through a vacuum.

Sound travels through the air very much more slowly than light does. Scientists know that in a thunderstorm the flash of light and the thunder start at the same time.

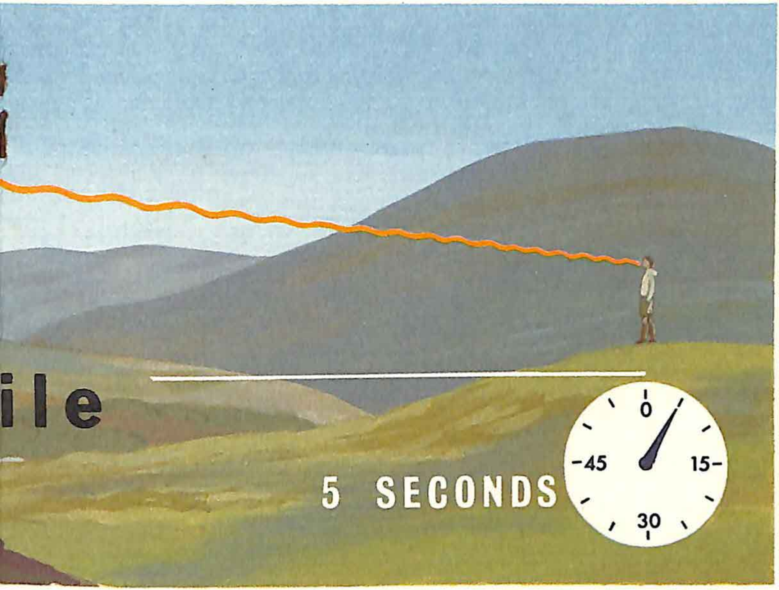
But we always see the flash of light before we hear the noise of the thunder.

The speed of a sound wave in the open air is about 1100 feet a second. The speed of light is 186,000 *miles* a second! This is nearly a million times faster than the speed of sound.


LIGHT
186,000
MILES
PER SEC.
SOUND
1,100
FEET
PER SEC.



This picture shows how the speed of sound can be found. The man on the left fires a gun. The man on the right, a mile away, hears the



bang nearly 5 seconds later. So the sound wave takes about 5 seconds to travel one mile. This is a speed of about 1100 feet a second.

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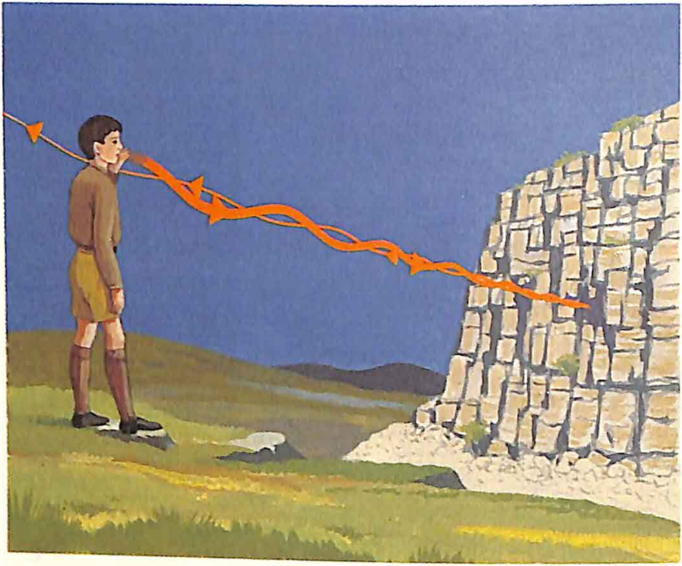

Sound waves can be reflected by large objects. Have you ever stood near a hill or mountain? If you shout loudly, you may hear your echo some seconds later.

Perhaps you have noticed that sounds seem to be much louder in an empty room than when the room is furnished.

This is because carpets and soft chairs are poor reflectors of sound. They *absorb* the sound.

In many modern concert halls, such as the Royal Festival Hall in London, the walls are often made of special materials which absorb some of the sound. This stops echoes from spoiling the sound of the music.

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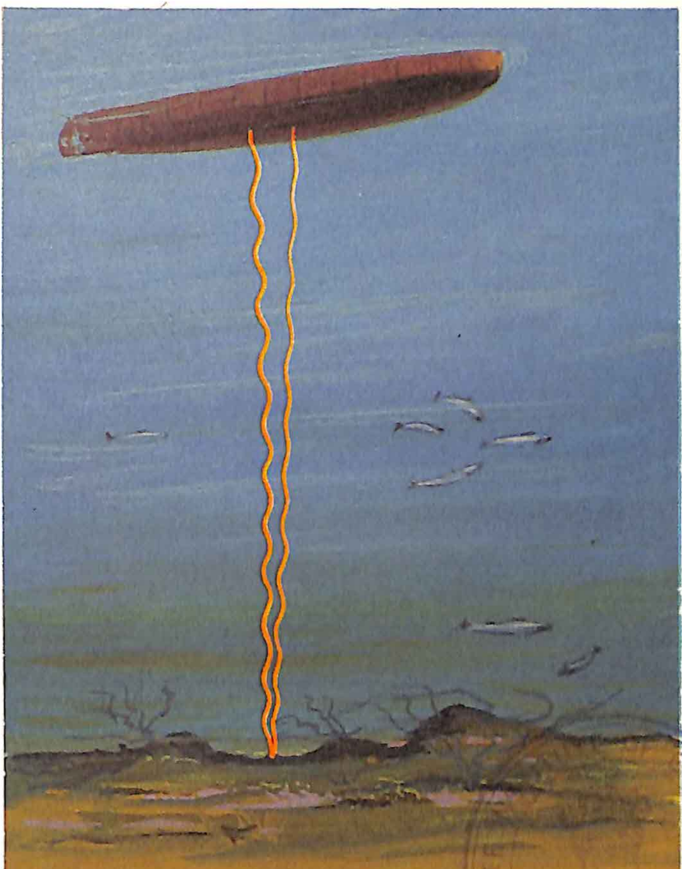
Sound travels at a different speed in water. This speed can be measured by sending sounds under water from one boat to another. It is about 4800 feet a second. So sound travels slower in air than in water.

Echoes are sometimes useful. Ships often carry instruments for sending sounds down to the ocean bed.

By measuring the time between sending the signal and hearing the echo, the depth of the ocean bed can be found.



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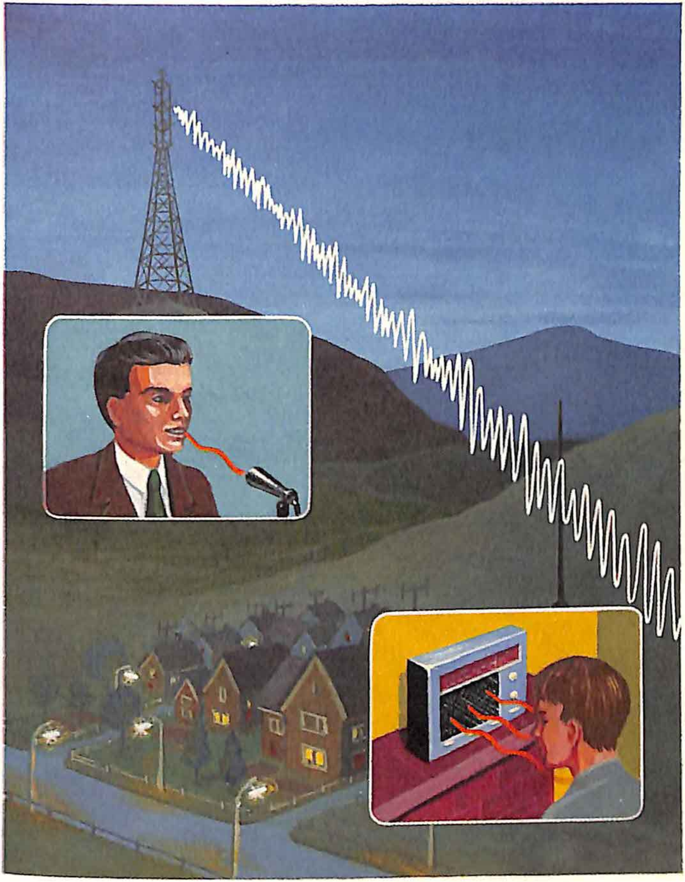
When you listen to the radio you hear the voices or music made in the studio perhaps a few miles, or maybe a thousand miles, away.

This is possible because the sound waves made by the announcer's voice or by the orchestra have been changed into radio waves at the broadcasting station.

The radio waves are transmitted into space by the aerial. They are then picked up by the aerial of your radio set and changed back into sound waves.



Many jet planes now fly at speeds faster than sound. We do not hear them coming until they have passed us. They have raced their own sound, and won!

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FIRST PUBLISHED 1966

PRINTED IN GREAT BRITAIN BY JARROLD AND SONS LIMITED, NORWICH

# READ ABOUT SCIENCE

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Illustrated by Ric Wylam

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